Annex II

Glossary, acronyms and abbreviations

Coordinating Lead Author
Philip Lloyd (South Africa)

Lead Authors
Peter Brewer (United States), Chris Hendriks (Netherlands), Yasumasa Fujii (Japan), John Gale (United Kingdom), Balgis Osman Elasha (Sudan), Jose Moreira (Brazil), Juan Carlos Sanchez (Venezuela), Mohammad Soltanieh (Iran), Tore Torp (Norway), Ton Wildenborg (Netherlands)

Contributing Authors
Jason Anderson (United States), Stefan Bachu (Canada), Sally Benson (United States), Ken Caldeira (United States), Peter Cook (United States), Richard Doctor (United States), Paul Freund (United Kingdom), Gabriela von Goerne (Germany)
Note: the definitions in this Annex refer to the use of the terms in the context of this report. It provides an explanation of specific terms as the authors intend them to be interpreted in this report.

**Abatement**
Reduction in the degree or intensity of emissions or other pollutants.

**Absorption**
Chemical or physical take-up of molecules into the bulk of a solid or liquid, forming either a solution or compound.

**Acid gas**
Any gas mixture that turns to an acid when dissolved in water (normally refers to H₂S + CO₂ from sour gas (q.v.)).

**Adiabatic**
A process in which no heat is gained or lost by the system.

**Adsorption**
The uptake of molecules on the surface of a solid or a liquid.

**Afforestation**
Planting of new forests on lands that historically have not contained forests.

**Aluminium silicate mineral**
Natural mineral – such as feldspar, clays, micas, amphiboles – composed of Al₂O₃ and SiO₂ plus other cations.

**Amine**
Organic chemical compound containing one or more nitrogens in -NH₂, -NH or -N groups.

**Anaerobic condition**
Reducing condition that only supports life which does not require free oxygen.

**Anhydrite**
Calcium sulphate: the common hydrous form is called gypsum.

**Antarctic Treaty**
Applies to the area south of 60 degrees South, and declares that Antarctica shall be used for peaceful purposes only.

**Anthracite**
Coal with the highest carbon content and therefore the highest rank (q.v.).

**Anthropogenic source**
Source which is man-made as opposed to natural.

**Anticline**
Folded geological strata that is convex upwards.

**API**
American Petroleum Institute; degree API is a measure of oil density given by (141.5/specific gravity) -131.5.

**Aquifer**
Geological structure containing water and with significant permeability to allow flow; it is bound by seals.

**Assessment unit**
A geological province with high petroleum potential.

**Assigned amount**
The amount by which a Party listed in Annex B of the Kyoto Protocol agrees to reduce its anthropogenic emissions.

**ATR**
Auto thermal reforming: a process in which the heat for the reaction of CH₄ with steam is generated by partial oxidation of CH₄.

**Autoproduction**
The production of electricity for own use.

**Basalt**
A type of basic igneous rock which is typically erupted from a volcano.

**Basel Convention**
UN Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which was adopted at Basel on 22 March 1989.

**Baseline**
The datum against which change is measured.

**Basin**
A geological region with strata dipping towards a common axis or centre.

**Bathymetric**
Pertaining to the depth of water.

**Benthic**
Pertaining to conditions at depth in bodies of water.

**Bicarbonate ion**
The anion formed by dissolving carbon dioxide in water, HCO₃⁻.

**Biomass**
Matter derived recently from the biosphere.

**Biomass-based CCS**
Carbon capture and storage in which the feedstock (q.v.) is biomass.
Bituminous coal
An intermediate rank of coal falling between the extremes of peat and anthracite, and closer to anthracite.

Blow-out
Refers to catastrophic failure of a well when the petroleum fluids or water flow unrestricted to the surface.

Bohr effect
The pH-dependent change in the oxygen affinity of blood.

Bottom-up model
A model that includes technological and engineering details in the analysis.

Boundary
In GHG accounting, the separation between accounting units, be they national, organizational, operational, business units or sectors.

Break-even price
The price necessary at a given level of production to cover all costs.

Buoyancy
Tendency of a fluid or solid to rise through a fluid of higher density.

Cap rock
Rock of very low permeability that acts as an upper seal to prevent fluid flow out of a reservoir.

Capillary entry pressure
Additional pressure needed for a liquid or gas to enter a pore and overcome surface tension.

Capture efficiency
The fraction of CO$_2$ separated from the gas stream of a source

Carbon credit
A convertible and transferable instrument that allows an organization to benefit financially from an emission reduction.

Carbon trading
A market-based approach that allows those with excess emissions to trade that excess for reduced emissions elsewhere.

Carbonate
Natural minerals composed of various anions bonded to a CO$_3^{2-}$ cation (e.g. calcite, dolomite, siderite, limestone).

Carbonate neutralization
A method for storing carbon in the ocean based upon the reaction of CO$_2$ with a mineral carbonate such as limestone to produce bicarbonate anions and soluble cations.

Casing
A pipe which is inserted to stabilize the borehole of a well after it is drilled.

CBM
Coal bed methane.

CCS
Carbon dioxide capture and storage.

CDM
Clean development mechanism: a Kyoto Protocol mechanism to assist non-Annex I countries to contribute to the objectives of the Protocol and help Annex I countries to meet their commitments.

Certification
In the context of carbon trading, certifying that a project achieves a quantified reduction in emissions over a given period.

Chemical looping combustion
A process in which combustion of a hydrocarbon fuel is split into separate oxidation and reduction reactions by using a metal oxide as an oxygen carrier between the two reactors.

Chlorite
A magnesium-iron aluminosilicate sheet silicate clay mineral.

Class “x” well
A regulatory classification for wells used for the injection of fluids into the ground.

Claus plant
A plant that transforms H$_2$S into elemental sulphur.

Cleats
The system of joints, cleavage planes, or planes of weakness found in coal seams along which the coal fractures.

CO$_2$ avoided
The difference between CO$_2$ captured, transmitted and/or stored, and the amount of CO$_2$ generated by a system without capture, net of the emissions not captured by a system with CO$_2$ capture.

CO$_2$ equivalent
A measure used to compare emissions of different greenhouse gases based on their global warming potential.

Co-benefit
The additional benefits generated by policies that are implemented for a specific reason.
COE
Cost of electricity, value as calculated by Equation 1 in Section 3.7.

Co-firing
The simultaneous use of more than one fuel in a power plant or industrial process.

Completion of a well
Refers to the cementing and perforating of casing and stimulation to connect a well bore to reservoir.

Congruence
The quality of agreement between two entities.

Conservative values
Parameter values selected so that a parameter, such as CO\textsubscript{2} leakage, is over-estimated.

Containment
Restriction of movement of a fluid to a designated volume (e.g. reservoir).

Continental shelf
The extension of the continental mass beneath the ocean.

COREX
A process for producing iron.

Cryogenic
Pertaining to low temperatures, usually under about -100°C.

D, Darcy
A non-SI unit of permeability, abbreviated D, and approximately = 1μm\textsuperscript{2}.

Dawsonite
A mineral: dihydroxide sodium aluminium carbonate.

Deep saline aquifer
A deep underground rock formation composed of permeable materials and containing highly saline fluids.

Deep sea
The sea below 1000m depth.

Default emissions factor
An approximate emission factor that may be used in the absence of precise or measured values of an Emissions Factor.

Demonstration phase
Demonstration phase means that the technology is implemented in a pilot project or on a small scale, but not yet economically feasible at full scale.

Dense phase
A gas compressed to a density approaching that of the liquid.

Dense fluid
A gas compressed to a density approaching that of the liquid.

Depleted
Of a reservoir; one where production is significantly reduced.

Diagenesis
Processes that cause changes in sediment after it has been deposited and buried under another layer.

DIC
Dissolved Inorganic Carbon.

Dip
In geology, the angle below the horizontal taken by rock strata.

Discharge
The amount of water issuing from a spring or in a stream that passes a specific point in a given period of time.

Discordant sequence
In geology, sequence of rock strata that is markedly different from strata above or below.

Dolomite
A magnesium-rich carbonate sedimentary rock. Also, a magnesium-rich carbonate mineral (CaMgCO\textsubscript{3}).

Double-grip packer
A device used to seal a drill string equipped with two gripping mechanisms.

Down-hole log
Record of conditions in a borehole.

Drill cuttings
The solid particles recovered during the drilling of a well.

Drill string
The assembly of drilling rods that leads from the surface to the drilling tool.

Drive
Fluid flow created in formations by pressure differences arising from borehole operations.

Dry ice
Solid carbon dioxide

Dynamic miscibility
The attainment of mixing following the prolonged injection of gas into an oilfield.
ECBM
Enhanced coal bed methane recovery: the use of CO\textsubscript{2} to enhance the recovery of the methane present in unminable coal beds through the preferential adsorption of CO\textsubscript{2} on coal.

Economic potential
The amount of greenhouse gas emissions reductions from a specific option that could be achieved cost-effectively, given prevailing circumstances (i.e. a market value of CO\textsubscript{2} reductions and costs of other options).

Economically feasible under specific conditions
A technology that is well understood and used in selected commercial applications, such as in a favourable tax regime or a niche market, processing at least 0.1 MtCO\textsubscript{2}/yr, with a few (less than 5) replications of the technology.

EGR
Enhanced gas recovery: the recovery of gas additional to that produced naturally by fluid injection or other means.

Emission factor
A normalized measure of GHG emissions in terms of activity, e.g., tonnes of GHG emitted per tonne of fuel consumed.

Emissions credit
A commodity giving its holder the right to emit a certain quantity of GHGs (q.v.).

Emissions trading
A trading scheme that allows permits for the release of a specified number of tonnes of a pollutant to be sold and bought.

Endothermic
Concerning a chemical reaction that absorbs heat, or requires heat to drive it.

Enhanced gas recovery
See EGR.

Enhanced oil recovery
See EOR

Entrained flow
Flow in which a solid or liquid, in the form of fine particles, is transported in diluted form by high velocity gas.

Entrainment gas
The gas employed in entrained flow (q.v.).

EOR
Enhanced oil recovery: the recovery of oil additional to that produced naturally by fluid injection or other means.

Euphotic zone
The zone of the ocean reached by sunlight.

Evaporite
A rock formed by evaporation.

Exothermic
Concerning a chemical reaction that releases heat, such as combustion.

Ex-situ mineralization
A process where minerals are mined, transferred to an industrial facility, reacted with carbon dioxide and processed.

Exsolution
The formation of different phases during the cooling of a homogeneous fluid.

Extended reach well
Borehole that is diverted into a more horizontal direction to extend its reach.

Extremophile
Microbe living in environments where life was previously considered impossible.

Far field
A region remote from a signal source.

Fault
In geology, a surface at which strata are no longer continuous, but displaced.

Fault reactivation
The tendency for a fault to become active, i.e. for movement to occur.

Fault slip
The extent to which a fault has slipped in past times.

FBC
Fluidized bed combustion: – combustion in a fluidized bed (q.v.).

Feldspar
A group of alumino-silicate minerals that makes up much of the Earth’s crust.

Feedstock
The material that is fed to a process

FGD
Flue gas desulphurization.

Fischer-Tropsch
A process that transforms a gas mixture of CO and H\textsubscript{2} into liquid hydrocarbons and water.
Fixation
The immobilization of CO$_2$ by its reaction with another material to produce a stable compound.

Fixed bed
A gas-solid contactor or reactor formed by a bed of stationary solid particles that allows the passage of gas between the particles.

Flood
The injection of a fluid into an underground reservoir.

Flue gas
Gases produced by combustion of a fuel that are normally emitted to the atmosphere.

Fluidized bed
A gas-solid contactor or reactor comprising a bed of fine solid particles suspended by passing a gas through the bed at sufficiently high velocity.

Folding
In geology, the bending of rock strata from the plane in which they were formed.

Formation
A body of rock of considerable extent with distinctive characteristics that allow geologists to map, describe, and name it.

Formation water
Water that occurs naturally within the pores of rock formations.

Fouling
Deposition of a solid on the surface of heat or mass transfer equipment that has the effect of reducing the heat or mass transfer.

Fracture
Any break in rock along which no significant movement has occurred.

Fuel cell
Electrochemical device in which a fuel is oxidized in a controlled manner to produce an electric current and heat directly.

Fugitive emission
Any releases of gases or vapours from anthropogenic activities such as the processing or transportation of gas or petroleum.

FutureGen Project
US Government initiative for a new power station with low CO$_2$ emissions.

Gas turbine
A machine in which a fuel is burned with compressed air or oxygen and mechanical work is recovered by the expansion of the hot products.

Gasification
Process by which a carbon-containing solid fuel is transformed into a carbon- and hydrogen-containing gaseous fuel by reaction with air or oxygen and steam.

Geochemical trapping
The retention of injected CO$_2$ by geochemical reactions.

Geological setting
The geological environment of various locations.

Geological time
The time over which geological processes have taken place.

Geomechanics
The science of the movement of the Earth’s crust.

Geosphere
The earth, its rocks and minerals, and its waters.

Geothermal
Concerning heat flowing from deep in the earth.

GHG
Greenhouse gases: carbon dioxide (CO$_2$), methane (CH$_4$), nitrous oxide (N$_2$O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF$_6$).

Hazardous and non-hazardous waste
Potentially harmful and non-harmful substances that have been released or discarded into the environment.

Hazardous waste directive
European directive in force to regulate definitions of waste classes and to regulate the handling of the waste classes.

HAZOP
HAZard and OPerability, a process used to assess the risks of operating potentially hazardous equipment.

Helsinki Convention
International legal convention protecting the Baltic water against pollution.

Henry’s Law
States that the solubility of a gas in a liquid is proportional to the partial pressure of the gas in contact with the liquid.

HHV
Higher heating value: the energy released from the combustion of a fuel that includes the latent heat of water.
Host rock
In geology, the rock formation that contains a foreign material.

Hybrid vehicle
Vehicle that combines a fossil fuel internal combustion engine and an alternative energy source, typically batteries.

Hydrate
An ice-like compound formed by the reaction of water and CO$_2$, CH$_4$ or similar gases.

Hydrodynamic trap
A geological structure in which fluids are retained by low levels of porosity in the surrounding rocks.

Hydrogeological
Concerning water in the geological environment.

Hydrostatic
Pertaining to the properties of a stationary body of water.

Hypercapnia
Excessively high CO$_2$ levels in the blood.

Hypoxia
Having low rates of oxygen transfer in living tissue.

Hysteresis
The phenomenon of a lagging recovery from deformation or other disturbance.

IEA GHG

IGCC
Integrated gasification combined cycle: power generation in which hydrocarbons or coal are gasified (q.v.) and the gas is used as a fuel to drive both a gas and a steam turbine.

Igneous
Rock formed when molten rock (magma) has cooled and solidified (crystallized).

Immature basin
A basin in which the processes leading to oil or gas formation have started but are incomplete.

Infrared spectroscopy
Chemical analysis using infrared spectroscope method.

Injection
The process of using pressure to force fluids down wells.

Injection well
A well in which fluids are injected rather than produced.

Injectivity
A measure of the rate at which a quantity of fluid can be injected into a well.

In-situ mineralization
A process where minerals are not mined: carbon dioxide is injected in the silicate formation where it reacts with the minerals, forming carbonates and silica.

International Seabed Authority

Ion
An atom or molecule that has acquired a charge by either gaining or losing electrons.

IPCC
Intergovernmental Panel on Climate Change

JI
Joint Implementation: under the Kyoto Protocol, it allows a Party with a GHG emission target to receive credits from other Annex 1 Parties.

Kyoto Protocol
Protocol to the United Nations Framework Convention on Climate Change, which was adopted at Kyoto on 11 December 1997.

Leach
To dissolve a substance from a solid.

Leakage
In respect of carbon trading, the change of anthropogenic emissions by sources or removals by sinks which occurs outside the project boundary.

Leakage
In respect of carbon storage, the escape of injected fluid from storage.

Levellized cost
The future values of an input or product that would make the NPV (q.v.) of a project equal to zero.

LHV
Lower heating value: energy released from the combustion of a fuel that excludes the latent heat of water.

Lignite/sub-bituminous coal
Relatively young coal of low rank with a relatively high hydrogen and oxygen content.
Limestone
A sedimentary rock made mostly of the mineral calcite (calcium carbonate), usually formed from shells of dead organisms.

LNG
Liquefied natural gas

Lithology
Science of the nature and composition of rocks

Lithosphere
The outer layer of the Earth, made of solid rock, which includes the crust and uppermost mantle up to 100 km thick.

Log
Records taken during or after the drilling of a well.

London Convention
On the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, which was adopted at London, Mexico City, Moscow and Washington on 29 December 1972.

London Protocol
Protocol to the Convention adopted in London on 2 November 1996 but which had not entered into force at the time of writing.

Low-carbon energy carrier
Fuel that provides low fuel-cycle-wide emissions of CO₂ such as methanol.

Macro-invertebrate
Small creature living in the seabed and subsoil, like earthworms, snails and beetles.

Madrid Protocol
A protocol to the 11th Antarctic Treaty to provide for Antarctica’s environmental protection.

Mafic
Term used for silicate minerals, magmas, and rocks, which are relatively high in the heavier elements.

Magmatic activity
The flow of magma (lava).

Marginal cost
Additional cost that arises from the expansion of activity. For example, emission reduction by one additional unit.

Maturation
The geological process of changing with time. For example, the alteration of peat into lignite, then into sub-bituminous and bituminous coal, and then into anthracite.

Mature sedimentary basins
Geological provinces formed by the deposition of particulate matter under water when the deposits have matured into hydrocarbon reserves.

MEA
Mono-ethanolamine

Medium-gravity oil
Oil with a density of between about 850 and 925 kg/m³ (between 20 and 30 API).

Membrane
A sheet or block of material that selectively separates the components of a fluid mixture.

Metamorphic
Of rocks that have been altered by heat or pressure.

Mica
Class of silicate minerals with internal plate structure.

Microseismicity
Small-scale seismic tremors.

Migration
The movement of fluids in reservoir rocks.

Mineral trap
A geological structure in which fluids are retained by the reaction of the fluid to form a stable mineral.

Miscible displacement
Injection process that introduces miscible gases into the reservoir, thereby maintaining reservoir pressure and improving oil displacement.

Mitigation
The process of reducing the impact of any failure.

Monitoring
The process of measuring the quantity of carbon dioxide stored and its location.

Monte Carlo
A modelling technique in which the statistical properties of outcomes are tested by random inputs.

Mudstone
A very fine-grained sedimentary rock formed from mud.

MWh
Megawatt-hour
National Greenhouse Gas Inventory
An inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases prepared by Parties to the UNFCCC.

Natural analogue
A natural occurrence that mirrors in most essential elements an intended or actual human activity.

Natural underground trap
A geological structure in which fluids are retained by natural processes.

Navier-Stokes equations
The general equations describing the flow of fluids.

Near-field
The region close to a signal source.

NGCC
Natural gas combined cycle: natural-gas-fired power plant with gas and steam turbines.

Non-hazardous waste
Non-harmful substances that have been released or discarded into the environment.

NPV
Net present value: the value of future cash flows discounted to the present at a defined rate of interest.

Numerical approximation
Representation of physico-mathematical laws through linear approximations.

Observation well
A well installed to permit the observation of subsurface conditions.

OECD
Organization for Economic Co-operation and Development

OSPAR
Convention for the Protection of the Marine Environment of the North-East Atlantic, which was adopted at Paris on 22 September 1992.

Outcrop
The point at which a particular stratum reaches the earth’s surface.

Overburden
Rocks and sediments above any particular stratum.

Overpressure
Pressure created in a reservoir that exceeds the pressure inherent at the reservoir’s depth.

Oxidation
The loss of one or more electrons by an atom, molecule, or ion.

Oxyfuel combustion
Combustion of a fuel with pure oxygen or a mixture of oxygen, water and carbon dioxide.

Packer
A device for sealing off a section of a borehole or part of a borehole.

Partial oxidation
The oxidation of a carbon-containing fuel under conditions that produce a large fraction of CO and hydrogen.

Partial pressure
The pressure that would be exerted by a particular gas in a mixture of gases if the other gases were not present.

$p_{\text{CO}_2}$
The partial pressure (q.v.) of CO$_2$.

PC
Pulverized coal: usually used in connection with boilers fed with finely ground coal.

Pejus level
The level in the ocean below which the functioning of animals deteriorates significantly.

Pelagic
Relating to, or occurring, or living in, or frequenting, the open ocean.

Perfluorocarbon
Synthetically produced halocarbons containing only carbon and fluorine atoms. They are characterized by extreme stability, non-flammability, low toxicity and high global warming potential.

Permeability
Ability to flow or transmit fluids through a porous solid such as rock.

Permian
A geological age between 290 and 248 million years ago.

Phytotoxic
Poisonous to plants.

Piezoelectric transducer
Crystals or films that are able to convert mechanical energy in electrical energy or vice-versa.
Pig
A device that is driven down pipelines to inspect and/or clean them.

Point source
An emission source that is confined to a single small location.

Polygeneration
Production of more than one form of energy, for example synthetic liquid fuels plus electricity.

Pore space
Space between rock or sediment grains that can contain fluids.

Poroelastic
Elastic behaviour of porous media.

Porosity
Measure for the amount of pore space in a rock.

Post-combustion capture
The capture of carbon dioxide after combustion.

POX
Partial oxidation (q.v.)

Pre-combustion capture
The capture of carbon dioxide following the processing of the fuel before combustion.

Primary legal source
Legal source not depending on authority given by others.

Probability density function
Function that describes the probability for a series of parameter values.

Prospectivity
A qualitative assessment of the likelihood that a suitable storage location is present in a given area based on the available information.

Proven reserve
For oil declared by operator to be economical; for gas about which a decision has been taken to proceed with development and production; see Resource.

Province
An area with separate but similar geological formations.

PSA
Pressure swing adsorption: a method of separating gases using the physical adsorption of one gas at high pressure and releasing it at low pressure.

Rank
Quality criterion for coal.

Reduction
The gain of one or more electrons by an atom, molecule, or ion.

Reduction commitment
A commitment by a Party to the Kyoto Protocol to meet its quantified emission limit.

Reforestation
Planting of forests on lands that have previously contained forests but that have been converted to some other use.

Regional scale
A geological feature that crosses an entire basin.

Remediation
The process of correcting any source of failure.

Renewables
Energy sources that are inherently renewable such as solar energy, hydropower, wind, and biomass.

Rep. Value
Representative value.

Reproductive dysfunction
Inability to reproduce.

Reserve
A resource (q.v.) from which it is generally economic to produce valuable minerals or hydrocarbons.

Reservoir
A subsurface body of rock with sufficient porosity and permeability to store and transmit fluids.

Residual saturation
The fraction of the injected $\text{CO}_2$ that is trapped in pores by capillary forces.

Resource
A body of a potentially valuable mineral or hydrocarbon.

Retrofit
A modification of the existing equipment to upgrade and incorporate changes after installation.

Risk assessment
Part of a risk-management system.

Root anoxia
Lack, or deficiency, of oxygen in root zone.

Root zone
Part of the soil in which plants have their roots.
**Safe Drinking Water Act**
An Act of the US Congress originally passed in 1974. It regulates, among other things, the possible contamination of underground water.

**Saline formation**
Sediment or rock body containing brackish water or brine.

**Saline groundwater**
Groundwater in which salts are dissolved.

**Sandstone**
Sand that has turned into a rock due to geological processes.

**Saturated zone**
Part of the subsurface that is totally saturated with groundwater.

**Scenario**
A plausible description of the future based on an internally consistent set of assumptions about key relationships and driving forces. Note that scenarios are neither predictions nor forecasts.

**SCR**
Selective catalytic reduction

**Scrubber**
A gas-liquid contacting device for the purification of gases or capture of a gaseous component.

**Seabed**
Borderline between the free water and the top of the bottom sediment.

**Seal**
An impermeable rock that forms a barrier above and around a reservoir such that fluids are held in the reservoir.

**Secondary recovery**
Recovery of oil by artificial means, after natural production mechanisms like overpressure have ceased.

**Sedimentary basin**
Natural large-scale depression in the earth’s surface that is filled with sediments.

**Seismic profile**
A two-dimensional seismic image of the subsurface.

**Seismic technique**
Measurement of the properties of rocks by the speed of sound waves generated artificially or naturally.

**Seismicity**
The episodic occurrence of natural or man-induced earthquakes.

**Selexol**
A commercial physical absorption process to remove CO$_2$ using glycol dimethylethers.

**Shale**
Clay that has changed into a rock due to geological processes.

**Shift convertor**
A reactor in which the water-gas shift reaction, \( CO + H_2O = CO_2 + H_2 \), takes place.

**Simplex orifice fitting**
An apparatus for measuring the flow rate of gases or liquids.

**Sink**
The natural uptake of CO$_2$ from the atmosphere, typically in soils, forests or the oceans.

**SMR**
Steam methane reforming: a catalytic process in which methane reacts with steam to produce a mixture of H$_2$, CO and CO$_2$.

**SNG**
Synthetic natural gas: fuel gas with a high concentration of methane produced from coal or heavy hydrocarbons.

**SOFC**
Solid oxide fuel cell: a fuel cell (q.v.) in which the electrolyte is a solid ceramic composed of calcium- or yttrium-stabilized zirconium oxides.

**Soil gas**
Gas contained in the space between soil grains

**Solubility trapping**
A process in which fluids are retained by dissolution in liquids naturally present.

**Sour gas**
Natural gas containing significant quantities of acid gases like H$_2$S and CO$_2$.

**Source**
Any process, activity or mechanism that releases a greenhouse gas, an aerosol, or a precursor thereof into the atmosphere.

**Speciation**
The determination of the number of species into which a single species will divide over time.

**Spill point**
The structurally lowest point in a structural trap (q.v.) that can retain fluids lighter than background fluids.
Spoil pile
Heap of waste material derived from mining or processing operations.

SRES
Special Report on Emissions Scenarios; used as a basis for the climate projections in the TAR (q.v.).

Stabilization
Relating to the stabilization atmospheric concentrations of greenhouse gases.

Stable geological formation
A formation (q.v.) that has not recently been disturbed by tectonic movement.

Steam reforming
A catalytic process in which a hydrocarbon is reacted with steam to produce a mixture of \( \text{H}_2 \), CO and \( \text{CO}_2 \).

Stable geological formation
A formation (q.v.) that has not recently been disturbed by tectonic movement.

Steam reforming
A catalytic process in which a hydrocarbon is reacted with steam to produce a mixture of \( \text{H}_2 \), CO and \( \text{CO}_2 \).

Storage
A process for retaining captured \( \text{CO}_2 \) so that it does not reach the atmosphere.

Strain gauge
Gauge to determine the deformation of an object subjected to stress.

Stratigraphic
The order and relative position of strata.

Stratigraphic column
A column showing the sequence of different strata.

Stratigraphic trap
A sealed geological container capable of retaining fluids, formed by changes in rock type, structure or facies.

Stimulation
The enhancement of the ability to inject fluids into, or recover fluids from, a well.

Stripper
A gas-liquid contacting device, in which a component is transferred from liquid phase to the gas phase.

Structural trap
Geological structure capable of retaining hydrocarbons, sealed structurally by a fault or fold.

Structure
Geological feature produced by the deformation of the Earth’s crust, such as a fold or a fault; a feature within a rock such as a fracture; or, more generally, the spatial arrangement of rocks.

Structure contour map
Map showing the contours of geological structures.

Subsoil
Term used in London and OSPAR conventions, meaning the sediments below the seabed.

Sub-bituminous coal
Coal of a rank between lignite (q.v.) and bituminous (q.v.) coal.

Sustainable
Of development, that which is sustainable in ecological, social and economic areas.

Supercritical
At a temperature and pressure above the critical temperature and pressure of the substance concerned. The critical point represents the highest temperature and pressure at which the substance can exist as a vapour and liquid in equilibrium.

Synfuel
Fuel, typically liquid fuel, produced by processing fossil fuel.

Tail gas
Effluent gas at the end of a process.

Tailing
The waste resulting from the extraction of value from ore.

TAR
Third Assessment Report of the Intergovernmental Panel on Climate Change

TCR
Total capital requirement

Technical Potential
The amount by which it is possible to reduce greenhouse gas emissions by implementing a technology or practice that has reached the demonstration phase.

Tectonically active area
Area of the Earth where deformation is presently causing structural changes.

Tertiary
Geological age about 65 to 2 million years ago.

Tertiary recovery
Oil generated by a third method; the first is by pressure release or depletion, and the second by oil driven out by the injection of water.
Thermocline
The ocean phenomenon characterized by a sharp change in temperature with depth.

Thermohaline
The vertical overturning of water masses due to seasonal heating, evaporation, and cooling.

Top-down model
A model based on applying macro-economic theory and econometric techniques to historical data about consumption, prices, etc.

Toxemia
Poisoning, usually of the blood.

Toxicology
Scientific study of poisons and their effects.

Tracer
A chemical compound or isotope added in small quantities to trace flow patterns.

Transaction cost
The full cost of transferring property or rights between parties.

Trap
A geological structure that physically retains fluids that are lighter than the background fluids, e.g. an inverted cup.

Ultramafic rocks
An igneous rock consisting almost entirely of iron- and magnesium-rich minerals with a silica content typically less than 45%.

UNCLOS

Unconformity
A geological surface separating older from younger rocks and representing a gap in the geological record.

Under-saturated
A solution that could contain more solute than is presently dissolved in it.

UNFCCC
United Nations Framework Convention on Climate Change, which was adopted at New York on 9 May 1992.

Unminable
Extremely unlikely to be mined under current or foreseeable economic conditions

Updip
Inclining upwards following a structural contour of strata.

Upper ocean
The ocean above 1000m depth.

Vacuum residue
The heavy hydrocarbon mixture that is produced at the bottom of vacuum distillation columns in oil refineries.

Vadose zone
Region from the water table to the ground surface, also called the unsaturated zone because it is partially water-saturated.

Validation
In the context of CDM (q.v.), the process of the independent evaluation of a project by a designated operational entity on the basis of set requirements.

Ventilation
The exchange of gases dissolved in sea-water with the atmosphere, or gas exchange between an animal and the environment.

Verification
The proving, to a standard still to be decided, of the results of monitoring (q.v.). In the context of CDM, the independent review by a designated operational entity of monitored reductions in anthropogenic emissions.

Viscous fingering
Flow phenomenon arising from the flow of two largely immiscible fluids through a porous medium.

Well
Manmade hole drilled into the earth to produce liquids or gases, or to allow the injection of fluids.

Well with multiple completions
Well drilled with multiple branching holes and more than one hole being made ready for use.

Well-bore annulus
The annulus between the rock and the well casing.

Wellhead pressure
Pressure developed on surface at the top of the well.

Wettability
Surface with properties allowing water to contact the surface intimately.

Zero-carbon energy carrier
Carbon-free energy carrier, typically electricity or hydrogen.